Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Connect America Fund	)	WC Docket No. 10-90
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
Establishing Just and Reasonable Rates for Local Exchange Carriers	)	WC Docket No. 07-135
	)	
High-Cost Universal Service Support	)	WC Docket No. 05-337
	)	
Developing a Unified Intercarrier Compensation Regime	)	CC Docket No. 01-92
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
Lifeline and Link-Up	)	WC Docket No 03-109
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COMMENTS OF HAWAIIAN TELCOM, INC.

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TABLE OF CONTENTS

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COMMENTS OF HAWAIIAN TELCOM, INC.

Hawaiian Telcom, Inc. ("HT") hereby comments on the Commission's Notice of Proposed Rulemaking and Further Notice of Proposed Rulemaking in the above-captioned dockets released on February 9, 2011 (the "NPRM").[1]

[1] According to the NPRM (FCC 11-13), the Commission seeks comment on all sections of the NPRM other than Section XV within 45 days after the date of

I. INTRODUCTION & SUMMARY

The Commission recognizes that bringing comparable and affordable voice and broadband services to customers in Hawaii presents unique challenges. HT has documented these obstacles, and has before the Commission a petition for waiver of the current high-cost rules to address chronic underfunding in the highest-cost wire centers in the state.[2]

The NPRM implicitly recognizes both the insular nature of the state and the Native Hawaiian population as creating conditions that increase the difficulty of providing universal broadband service to the state.[3] Unlike other native peoples, the Native Hawaiian population is not highly concentrated in any geographic area of the state, but resides throughout the state.[4] As such the entire state should be considered "Tribal Lands" for purposes of dedicating resources to this historically disadvantaged population.

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publication of the NPRM in the Federal Register, or by April 18, 2011. *See* 76 Fed. Reg. 117632 (March 2, 2011).

[2] *See Comment Sought On Hawaiian Telcom, Inc.'s Petition For Waiver of High-Cost Universal Service Support Rules,* WC Docket 08-4, DA 08-131 (Wireline Competition Bur. Jan 18 2008). The *HT Petition* remains pending before the Commission.

[3] NPRM n. 4 (including the Hawaiian Home Lands ("HHL") in the definition of "Tribal lands" as used in the NPRM); para. 303 ("We recognize that communities on Tribal lands have historically had less access to telecommunications services than any other segment of the population"); *id.* ("Tribes need substantially greater financial support than is presently available to them, and accelerating Tribal broadband will require increased funding"), *citing* National Broadband Plan at 152; NPRM para. 307 ("we seek comment on whether we should provide bidding credits to bidders that propose to deploy to insular areas").

[4] 2006 Native Hawaiian Data Book, An Office of Hawaiian Affairs Publication, Demographics section, pp. 21-24. http://www.oha.org/pdf/databook/2006/DataBook2006Demographics.pdf.

In these comments, HT suggests several concrete steps the Commission should take to bring "robust, affordable broadband to all Americans"[5] and ensure that support is "specific, predictable and sufficient" to fund ubiquitous broadband infrastructure that is "critical to our nation's economic development and civic life."[6] In particular, HT advocates:

- Determining support at the wire center level, rather than study area-wide.
- Limiting support to one provider per household, capping support at $3,000 per line per year, and requiring that support be justified either under a model or by the recipient's own costs.
- Eliminating differences between rural and non-rural funding mechanisms.
- Classifying the state of Hawaii as "Tribal lands" for purposes of interstate support mechanisms, and setting aside support in the Phase I Connect America Fund ("CAF") to promote infrastructure expansion in the state.
- Replacing any phased-out IAS with new support.
- Adopting a right of first refusal for long-term CAF support.
- Requiring that any recipient of support accept the responsibilities of Carrier of Last Resort ("COLR") for the supported area.

II. REFORMS NEEDED TO BRING BROADBAND INFRASTRUCTURE TO HAWAII

HT supports the Commission's conclusion that the current universal service programs lead in some instances to inefficient results, and should be reformed to better meet the goal of promoting universal broadband service.[7] In Hawaii, no federal high-cost loop support ("HCLS") is available to HT, the incumbent local exchange carrier ("ILEC"), because HT operates a single, statewide study area classified as non-rural, even though over 90% of its service territory is sparsely populated.

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5 NPRM para. 1.

6 NPRM para. 3.

HT continues to serve customers in the rural areas of the state today despite receiving zero HCLS; indeed, HT is obligated as the ILEC and Carrier of Last Resort in the state ("COLR") to provide service to the entire state upon request. It is easy to see how HT is at an enormous competitive disadvantage in this environment.

Commission policies that facilitate the inefficiencies were well intended to ensure that all Americans have access to reasonably comparable services at affordable rates. They were not intended to put the ILEC or its customers at a gross disadvantage. Yet that's exactly their effect. Distinctions between rural and non-rural study areas, rules that require support to be determined based on study-area-wide costs, and the identical support rule all combine to produce the effects described above. HT suggests that this situation can be put right with relatively modest reforms.

Historic study area boundaries that may have made sense in a non-competitive environment can no longer be squared with market conditions. Moreover, the proposals set forth in the NPRM would eliminate the distinction between rural and non-rural funding mechanisms. The Commission also recognizes that some high-cost areas require investment not only in local loop plant but also middle-mile facilities in order to bring robust connectivity to distant communities.[8] HT supports proposed changes to address each of these issues.

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7 *E.g.,* NPRM para. 1.

8 Federal Communications Commission, *Connecting America: the National Broadband Plan (*rel. March 16, 201) at 136, 141 (recommending additional funding in high-cost areas for middle-mile infrastructure to transport voice and data traffic to an Internet point of presence).

HT advocates that the need for support be determined at a more granular level, and be permitted to be invested flexibly in infrastructure needed to bring broadband connectivity to all communities, regardless of rural or non-rural status. HT has demonstrated that determining the need for support at the wire center level in Hawaii, using the FCC's existing high-cost proxy model ("HCPM") for non-rural study areas, will produce a modest amount of support sufficient to fund a significant improvement in broadband availability in the state. Specifically, HT is seeking a waiver of the current non-rural high-cost support rules to determine eligibility for support in its study area (*i.e .,* the state of Hawaii) under the HCPM, which HT estimates would produce support for a subset of the highest-cost wire centers served by HT, a total of approximately $4.9 million per year, and allow HT to construct last-mile and middle-mile facilities across more than three thousand miles of the state and among five separate islands.[9] At a minimum, the Commission should determine support eligibility at a more granular level.[10]

In addition, HT supports immediate revisions to the "identical support" rule that funds competitors regardless of their contribution to advanced infrastructure in the state. The Commission has been exploring changes to the identical support rule for some time, recognizing that, particularly in the case of Commercial Mobile

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[9] *See HT Petition, supra,* note 3. Ideally, HT would connect the island of Lanai as well as the other five major islands, but this would be possible only if additional support were made available for Lanai.

[10] NPRM para. 293 (suggesting that census blocks, or other areas smaller than study areas, may be a more workable measure). The attached map of Molokai demonstrates the difference between wire center boundaries, zip codes, and census blocks. *See* Appendix.

Radio Service ("CMRS") carriers, it produces unjustified amounts of support.[11] The NPRM suggests several alternatives.[12]

HT recommends that support be limited to one provider per household, and that support eligibility be linked to a provider's willingness to accept COLR responsibilities for the households for which it desires support. HT also supports the establishment of a nationwide upper limit on high-cost support at $3,000 per line per year. [13] HT believes that some wire centers – such as Kalaupapa in HT's own study area – may require more high-cost support for ubiquitous broadband coverage. However, in the interest of improving efficiency of the nationwide program, HT supports a requirement that any ETC wishing to receive support at a higher per-line level for a particular area be required to justify that support through a waiver petition.

Indeed, while HT offers reliable wireline-based service, and deploys fiber wherever possible, it often competes for voice and broadband customers with CMRS carriers that receive support for bringing mobile service to rural areas. Ironically, the CMRS carrier may depend on HT's network for backhaul capability to remote cell sites, yet the CMRS carrier receives support where HT does not. Thus, without HT's network, they have no service in these areas. Public policy should favor continued investment in transport infrastructure to these rural cell sites, and permit support to HT for this essential service. As HT is able to expand its rural

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11 NPRM para. 242. *See also High-Cost Universal Service Support (Interim Cap Order),* WC Docket 05-337, 23 FCC Rcd 8834, 8838 (2008).

12 NPRM para. 242 (seeking comment on redirecting some or all CETC funding to CAF for redistribution through market-based mechanisms)

13 NPRM para. 212.

infrastructure with this support, rural residential customers will benefit from the increased network capabilities and enhanced competitive alternatives.

III. COMMENTS ON TRANSITIONING IAS TO THE CAF

In Section VI.C. of the NPRM, the Commission seeks comment on "transitioning" amounts currently paid to price cap ILECs through Interstate Access Support ("IAS") to the Connect America Fund ("CAF") over "a few years" beginning in 2012.[14] Like other price cap ILECs, HT relies on IAS to keep its rates at reasonable levels and support infrastructure investment. Though this support is expected gradually to decline with loop loss, it has been a substantial and reasonably predictable source of revenue for HT.[15] Therefore, HT urges the Commission to carefully consider the impact that any such change could have on the ILECs' ability to maintain current investment levels in the public switched telecommunications network as well as to devote new investment to advanced, IP-based broadband networks.

As noted in the NPRM, IAS supports local loop costs and serves to reduce the amount of revenue that price cap ILECs otherwise would recover from other carriers or end-users. Thus, IAS helps keep affordable HT's rates for both local exchange and exchange access services.[16] Due to the functioning of the IAS cap, the

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14 NPRM paras. 228. The Commission seeks comment on eliminating half of IAS in 2012 and the remaining IAS in 2013, or accomplishing the "transition" more gradually. *Id.* para. 234. However, the NPRM is not clear on how a carrier receiving IAS would "transition" to receiving CAF or whether the "transition" would go to the state where the carrier formerly receiving IAS is located. *See id*. para. 238.

15 In each of 2008 and 2009, HT received approximately $1.8 million in IAS. In 2010, HT received approximately $1.9 million in IAS.

16 NPRM para. 229.

total amount of IAS disbursed to all price cap ILECs has declined from $650 million in 2000 to $458 million in 2010.[17] The average amount of IAS distributed to price cap ILECs per line per month was $0.44 in 2010.[18] The Commission questions whether IAS "continues to be necessary to address its original intended purpose of maintaining affordable voice service."[19]

Before the Commission eliminates this amount, it should consider the foreseeable detrimental consequences to end-user rates – namely, they will increase except where state rules or competition prevent it – and whether the presumed benefit of cutting $0.44 per line per month from interstate access charges is worth the burden this will place either on end-users or on the affected carriers' investment incentives. HT submits that the proposed phase-out of IAS will do nothing to advance the FCC's broadband investment goals, and instead will discourage investment in and use of the ILECs' networks.

IV. COMMENTS ON THE PROPOSED PHASE I CAF

Section VI.E. of the NPRM describes in broad terms the creation of a mechanism to award funding targeted to "deployment of robust fixed or mobile broadband in areas of the country that lack even basic broadband today.[20] HT supports this goal, but suggests several modifications to the mechanism proposed by the Commission.

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17 NPRM paras. 230-231.
18 NPRM para. 231.
19 NPRM para. 232.
20 NPRM para. 261.

First, HT opposes the notion of limiting eligibility for Phase I CAF support to "states that have engaged in access charge reform" or "states that have established high-cost universal service or other broadband support mechanisms."[21] Support should be prioritized to address those populations that historically have been under-served by state-of-the-art infrastructure, as well as populations that have the greatest need for access to broadband because of their remote location or underprivileged status. The people of Hawaii, and Native Hawaiians in particular, fit both of these definitions.

HT supports the reservation of "a defined amount of funds in the first phase of the CAF to award to bidders that will deploy broadband on Tribal lands that are unserved."[22] As the Commission recognizes, "Tribal lands have historically had less access to telecommunications services than any other segment of the population" and "Tribal lands are often located in rural, high-cost areas, and present distinct connectivity challenges."[23] These same findings are true of the state of Hawaii. Not only is it distinctly difficult to serve,[24] but also it is home to the historically disadvantaged population of Native Hawaiians. HT therefore supports the inclusion of the entire state of Hawaii in this special set-aside Phase I CAF.

Native Hawaiians are a historically disadvantaged population, like other Native American groups. State data also show that Native Hawaiians tend to suffer from higher poverty levels than other residents of the state.[25] Unlike some other

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21 NPRM para. 270.
22 NPRM para. 302.
23 NPRM para. 303.
24 *See* Appendix and *HT Petition*.
25 U.S. Census Bureau, 2005-2009 American Community Survey.

Native American populations, however, Native Hawaiians are quite geographically dispersed across the entire state of Hawaii. Native Hawaiians constitute roughly 26 percent of the total population of Hawaii.[26] While a small percentage of Native Hawaiians reside in the HHL, about 92 percent of Native Hawaiians in the state reside outside the HHL.

Just as Native Hawaiians comprise 26 percent of the statewide population overall, they comprise a substantial portion of the population in sparsely populated areas (*i.e.,* outside Honolulu). For example, in the third of its wire centers that HT has identified as the most expensive to serve, HT estimates that Native Hawaiians comprise 28 percent of the local population. Thus, Native Hawaiians both are historically disadvantaged and tend to live in areas that are underserved by advanced communications infrastructure.[27] For these reasons, HT believes the Commission would be justified in declaring the entire state outside of the urban center of Honolulu an "underserved" area, and setting aside specific support for broadband deployment there.

HT notes that adopting special support rules for an entire state is not without FCC precedent. In the case of high-cost CETC support under the universal service program, the Commission adopted special rules for Tribal Lands that apply uniquely to the entire state of Alaska, because the Alaska Native regions as defined in the

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[26] 2010 U. S. Census Bureau Redistricting Data Summary File for Hawaii.

[27] In the attached Appendix, a map of Molokai demonstrates the difference between the boundaries of Hawaiian Home Lands versus the location of communities with above-average numbers of Native Hawaiian residents.

Alaska Native Claims Settlement Act encompass the entire state.[28] The Commission should act in a parallel fashion with respect to the Phase I CAF, treating the state of Hawaii as home to a Native population and thus eligible for support designated especially for Native and Tribal communities.[29] Alternatively, the Commission should reserve a sufficient amount of support, or provide bidding credits, for broadband infrastructure build-out in insular areas.[30] As the Commission notes, it is appropriate to set aside funds specifically targeted to insular areas that trail national broadband coverage.

V. COMMENTS ON THE LONG-TERM VISION FOR THE CAF

HT comments briefly on some of the remaining proposals set forth in Section VII of the NPRM. In particular, HT supports a cautious approach to the redistribution of revenues proposed in the Commission's NPRM. While 2020 may appear to be a long-term target for elimination of high-cost support programs and creation of a CAF, it allows only a short transition period for COLRs such as HT. HT therefore supports the proposed "right of first refusal" ("ROFR") for the COLR to receive CAF in support of its voice and broadband offerings.[31] HT believes that support should follow COLR responsibilities. So if the Commission does not provide long-term CAF adequate to meet the COLR's requirements for universal service, the

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28 *Federal-State Joint Board on Universal Service; Promoting Deployment and Subscribership in Unserved and Underserved Areas, Including Tribal and Insular Areas; Commonwealth of Northern Mariana Islands,* CC Docket 96-45, Twenty-Fifth Order on Reconsideration, Report & Order, and Further Notice of Proposed Rulemaking, FCC 03-115 (rel. May 21, 2003).

29 C*f.* NPRM para. 304-305.

30 NPRM para. 306-307.

31 NPRM para. 431.

latter should be permitted to negotiate a hand-off of its COLR responsibilities to whatever entity offers to serve the area for less.

VI. CONCLUSION

HT supports reforms that will more accurately target high-cost support to areas that are truly high-cost to serve, and service providers that are truly committed to offer service to all, as the Carrier of Last Resort. HT respectfully submits that the Commission's policies most effective at driving infrastructure investment will be those that allow for incremental change and focus on the most disadvantaged areas and populations, such as Tribal Lands and insular communities. HT believes that the modest proposals suggested in these Comments would result in dramatic improvements in broadband availability in Hawaii, while placing sensible limits on the overall cost to consumers nationwide.

Respectfully submitted,

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APPENDIX:
BACKGROUND ON THE UNIQUE CHALLENGES OF BRINGING BROADBAND TO HAWAII

Hawaii is the most isolated land mass on the planet. Outsiders are frequently unfamiliar with the state's unique geography, geology, topography and population characteristics, which combine to make deploying infrastructure more challenging – and, by the same token, even more vital – than in other parts of the country. HT therefore offers this background for the benefit of the record in this proceeding.[32]

GEOGRAPHIC ISOLATION WITHIN THE STATE AND BETWEEN THE STATES

Located in the middle of the Pacific Ocean, Hawaii is considered to be the most geographically isolated of all major population centers on the planet. The last state to join the Union, Hawaii is over 2,500 miles from the closest point on the mainland United States. Even within the state, residents are isolated from one another because Hawaii is comprised entirely of volcanic islands. It is the only island state in the U.S., and the only state whose land mass is growing significantly, day by day, due to volcanic activity. The six largest islands in the archipelago (the "Big Island" of Hawaii, Kauai, Lanai, Maui, Molokai and Oahu) are separated from each other by ocean channels that reach depths of over 10,000 feet, and span distances of over 100 miles. Hawaii's geographically isolated location and island composition create distinct challenges and network complexities for advanced infrastructure deployment.

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[32] Much of this material, as well as additional information about telecommunications service in Hawaii, is set forth in the *HT Petition*.

For example, Hawaiian Telcom ("HT") maintains undersea fiber-optic cable between the islands of Kauai and Oahu spanning some 120 miles of ocean, 65 miles of which are over 10,000 feet deep.[33] The remote island configuration of the state raises costs and imposes unique technical obstacles to HT's provision of service, as described below.

In 1994, HT's predecessor established a deep-sea, submarine fiber optic network to connect the islands of Kauai, Oahu, Maui and Hawaii, and augment HT's existing inter-island digital microwave network. Even today, however, the only HT facilities connecting the islands of Molokai and Lanai to the outside world are microwave links. The existing capacity of HT's fiber network and microwave technology severely limits HT's ability to accommodate growth and to launch new services, especially broadband services.

Hawaii is the only state for which deep-sea submarine fiber and microwave links are essential to provide both intrastate and interstate transport. Since microwave solutions have limited bandwidth and distance limitations, and are affected by atmospheric conditions, fiber has proven to be the best choice for providing inter-island connectivity.

Fiber faces its own limitations, however. Reliance on undersea fiber optic cables requires expensive deep-sea equipment to place and maintain submarine cables between the islands. Strong ocean currents, violent storms, tsunamis, volcanic activity, and sea-quakes are just some of the events that can disrupt network operations and increase costs.

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[33] As shown in Exhibit 1 to the *HT Petition*, a map created by the National Oceanographic and Atmospheric Administration (NOAA), depths along the undersea cable route between the islands reach more than 2500 fathoms or 15,000 feet.

Additionally, because Hawaii is not home to any ships specializing in the placement, repair, and maintenance of deep sea fiber cables, it can take over a week – sometimes months – to obtain the appropriate equipment and restore damaged cables. As an example, when Time Warner Cable and Wavecom experienced a break in their inter-island fiber optic cable between Oahu and Maui in July 2010, a ship was deployed to repair the cable about five weeks after the cut.[34]

Overcoming these limits is costly. Notably, to accommodate increased demands for fiber transport capacity in the state, HT installed custom-engineered lasers along the Kauai segment of HT's fiber network. Fujitsu engineers in Japan developed these lasers to sustain communications over longer distances, at HT's request. These lasers were not available off-the-shelf and had to be custom built, at great cost to HT.

GEOLOGY AND TOPOGRAPHY MATTER

As noted above, Hawaii is unique among U.S. states in that it has been created entirely through volcanic activity. Volcanic activity poses great risk to people and property on the Big Island of Hawaii, where lava flows have been active for more than two decades.[35] The ongoing eruption of Kilauea destroyed HT facilities in the Royal Gardens subdivision and the Kalapana area, for example, and will continue to pose a risk to the Puna district for the foreseeable future. Mauna Loa, another highly active volcano, has lava flows capable of reaching 70 percent of the island.

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34 HT bases this assessment on the time during which traffic was diverted to the HT network under HT's restoration agreement with Time Warner.

35 *See* United States Geological Survey, Lava Flow Hazard Zone Maps (Dec. 18, 1997), *available at* http://pubs.usgs.gov/gip/hazards/maps.html

The risk of seismic activity is ever present as well, affecting the installation and maintenance of telecommunications equipment and the safety of HT employees. This was vividly illustrated in October 2006 when a large seaquake totally isolated the town of Kipahulu, located on the island of Maui, for weeks by destroying HT's facilities and compromising roads that could have been used for repairs. While HT's facilities escaped damage from the recent tsunami generated by the Japan earthquake on March 11, 2011, certain coastal areas of the state received substantial enough damage to be declared a disaster area by the federal government.

Apart from the risks associated with seismic activity and lava flows, these islands are characterized by mountainous, uneven terrain that is generally inhospitable to telecommunications infrastructure. Volcanic mountains on each of the islands, such as the snow-capped peaks of Mauna Loa and Mauna Kea that rise nearly 14,000 feet, often dictate the design of HT's network and the ability of remote communities to access and rely on HT's facilities. In the vast majority of cases, it is impossible or impractical to traverse an island over these mountains with terrestrial interoffice fiber facilities, limiting the placement of HT's facilities to coastal regions and isolated corridors between mountain ranges. This limitation, in turn, prevents HT from employing diverse, short routes that avoid known hazards.

By forcing HT to construct coastal facilities, Hawaii's volcanic and insular nature also places those facilities at greater risk of damage from coastal dangers, such as corrosive sea air, and damaging tsunamis and hurricanes. Mere exposure to salt water along Hawaii's coast – which is extended far inland via trade winds – drives up facility costs. Salt rapidly corrodes traditional galvanized equipment, dramatically shortening its useful life by up to 80

percent, compared to what typically would be expected in inland areas protected from salt exposure. The most problematic locations scattered throughout the islands require HT to use specialized materials, such as stainless steel down guys and messengers, which are much more expensive than conventional, galvanized equipment.[36] HT has also had to build walls around remote DLC devices along the shore to prevent salt spray from corroding the cabinets and electronics, further increasing HT's costs.

The Hawaiian Islands also are characterized by dense rain forests. The generally forested terrain has been shaped by millions of years of erosion by rain, and the thousands of streams on the islands have carved deep trenches in the volcanic rock. Natural boundaries such as trenches and dense forests have further isolated already remote communities, while at the same time posing engineering challenges to the design and construction of HT's facilities.

Since wireless communications are normally extremely difficult in dense forests and deep valleys, and commercial power is not widely available, HT has been forced to adapt its network architecture to the terrain using complicated solutions at considerable cost. For example, in order to serve remote valleys like Kalaupapa[37] on the island of

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[36] Down guys are critical connections to anchors in the ground that provide strength to poles in situations where a sequence of poles is not in a straight line. Due to a "pull" in one direction, the down guys provide a counter force to keep the pole upright, otherwise the entire pole line is compromised. Messengers are strung between poles and support and hold the cable lashed (*i.e.,* connected) to it. Once a messenger breaks, the cable normally droops and could fall.

[37] The Kalaupapa Peninsula is extremely isolated, cut off from the rest of Molokai by sea cliffs rising two thousand feet and otherwise surrounded by ocean. There is no access to the area by ground vehicle, and the only option for transporting heavy equipment to the area on a timely basis is by helicopter, since a barge makes scheduled visits to the area only twice per year. Visitors may access the area via passenger aircraft or private boat, or by riding mules down the steep Kalaupapa Trail from topside Molokai.

Molokai, and parts of Waipio on the island of Hawaii, which are inaccessible by land vehicles, HT transports materials by helicopter or constructs materials on-site by hand. HT also has engineered custom facilities to cross the wide spans of the Malua, Laupahoehoe, and Kawalii gulches in order to serve the remote communities along the Hamakua coast on the island of Hawaii. In other areas, HT cannot use vehicles due to weight limitations.[38] While the ingenuity of HT's engineers has often allowed HT to identify solutions to such obstacles, such solutions invariably involve expenses not incurred in other locations.

The Big Island of Hawaii is geologically the youngest in the Hawaiian island chain,[39] giving rise to additional engineering challenges due to the island's soil composition. Grounding of plant, for example, is more difficult on the Big Island than it is in other areas, as a result of Hawaii's combination of high soil resistivity and soft water. Unlike other mainland sites, Hawaii soils are not usually rich in reactive minerals like calcium carbonate from sedimentary rocks such as limestone. Instead, high soil resistivity is caused by the presence of oxides, which are inert chemical compounds that create poor grounding characteristics. The presence of these oxides makes the grounding of HT's telephone network much more expensive, even requiring soil conditioning in

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38 For example, vehicle weight limitations on the bridges near Hanalei on the island of Kauai – the only way in or out of this community – have prohibited HT from using construction or maintenance vehicles there.

39 The Hawaiian Islands were produced by the Hawaiian hot spot, which is presently located under the island of Hawaii. In general, the islands become older as one moves northwest along the archipelago from Hawaii in the southeast. The youngest of the volcanoes forming the island of Hawaii are less than 0.5 million years old. In contrast, the volcanoes forming the island of Oahu are several million years old. *See* Hawaii Center for Volcanology, *The Formation of the Hawaiian Islands* (last updated Apr. 4, 2005), *available at* http://www.soest.hawaii.edu/GG/HCV/haw_formation.html.

certain cases. Similarly, fresh water, coming primarily from rain, is soft, not hard and mineral-laden like it is in mainland states. Because soft water contains fewer dissolved mineral ions, it does not conduct electricity as well as hard water does. The relative youth of the island of Hawaii also results in higher undergrounding and trenching costs due to the presence of more "blue rock."[40]

ALL PARTS OF THE STATE OUTSIDE HONOLULU ARE RURAL

The harsh conditions described above, and the dramatic variations in topography across even short distances, telecommunications infrastructure deployment especially difficult in the sparsely populated areas of the state outside of Honolulu.[41] The island of Oahu, which comprises approximately 9 percent of Hawaii's land mass, houses about 70 percent of its population, with the vast majority located in a single city, Honolulu. The remaining islands comprise approximately 91 percent of Hawaii's landmass, but house only about 30 percent of its population.[42] Outside of Honolulu, therefore, the state's population density is generally extremely low.[43] The same is true with respect to geographic loop density, with only three of HT's wire centers, all located in Honolulu, having line density greater than 10,000 loops per square mile.

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40 "Blue rock" is an extremely dense and hard form of volcanic rock found in Hawaii. It "is the bane of contractors, especially road builders and pipeline installers, because it is difficult to break. The largest bulldozers and backhoes are regularly humbled by this dense rock, causing contractors to revert to expensive drilling and blasting techniques." *See* United States Geological Survey, Hawaiian Volcano Observatory, *Lava Rocks Come in Many Colors*, (Oct. 19, 2000), *available at* http://hvo.wr.usgs.gov/volcanowatch/2000/00_10_19.html.

41 Tellingly, Hawaii is home to eleven of the thirteen climate zones recognized by the Koppen climate classification system.

42 *See 2010 U. S. Census Bureau Redistricting Data Summary File for Hawaii*

43 2006 HAWAII DATA BOOK, Table 1.11.

Tsunamis, hurricanes, volcanic activity, landslides, and other hazards do more than threaten HT's facilities; they also threaten to isolate Hawaii's residents, making effective telecommunications services even more critical for Hawaii's remote communities. Even heavy rainfall can cause landslides that prevent vehicular access to remote towns. For example, the towns of Pahala and Naalehu on the island of Hawaii are isolated with every heavy rain, as flooding effectively closes Highway 11 in the same location time after time. HT's facilities often offer the only way to communicate with these communities during and after these rains.

Telecommunications networks in Hawaii therefore need to be built with extraordinarily high levels of redundancy and reliability. When natural or man-made disasters cause HT's network to fail, emergency materials and resources may need to be air- or sea-lifted from neighboring islands or the mainland, making them potentially days or weeks away. For example, following Hurricane Iniki in 1992, restoration efforts for Kauai took well over a year to complete, as much of HT's outside plant infrastructure had to be rebuilt. In areas in which HT's facilities survived, those facilities were critical to safety and restoration efforts island-wide – underscoring the additional benefits that could be delivered to Hawaii's population with greater network redundancy.

The low loop densities associated with many of HT's wire centers can be attributed, in part, to the development of real estate subdivisions in relatively remote areas of Hawaii, many of which have never grown in size to the extent originally projected. Beginning in the 1950's, subdivisions were created on thousands of large acreage lots in relatively remote areas, without adequate infrastructure by today's standards. These areas lack potable water systems, electricity, sewer facilities and

telecommunications systems. Many of these subdivisions have substandard private roads that are not maintained by the local or state governments, lack commercial electricity, are filled with dense foliage, and face other challenges not found in urban and suburban areas. For example, the Puna district on the island of Hawaii, despite a land mass that is equivalent to that of the island of Oahu, lacks any meaningful infrastructure to serve its inhabitants. HT has just four central offices to serve this area (Oahu is served by 39), serving a population of approximately 31,000[44], requiring long individual customer loops exceeding 35,000 feet in length. Nevertheless, a resident could move into any of approximately 46,000 lots in the Puna district and HT, as the carrier of last resort, would be required to provide service to that individual despite the extremely high cost of doing so.

HAWAII'S STRATEGIC IMPORTANCE NECESSITATES INFRASTRUCTURE INVESTMENT

Hawaii's isolation gives the state unique strategic importance for the country, which in turn increases Hawaii's vulnerability and makes loss of service in Hawaii potentially catastrophic. Hawaii's command of the Pacific Ocean and proximity to the Far East means that the U.S. military presence in Hawaii is critical to ensuring stability and security in the Asia Pacific region. The U.S. Pacific Command HQ, located in Hawaii, is responsible for monitoring: (i) over 50 percent of earth's surface, from the west coast of the U.S. mainland to the east coast of Africa, and from the Arctic to Antarctic; (ii) nearly 60 percent of the world's population; (iii) 43 countries, 20 territories and

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44 *See* Leila Fujimori, *Social Ills Common in Rural Puna District*, HONOLULU STAR-BULLETIN (Feb. 17, 2005), *available at* http://starbulletin.com/2005/02/17/news/story3.html.

possessions, and 10 U.S. territories; (iv) the world's largest armed forces (other than the U.S.) in the People's Republic of China, Russia, India, North Korea and South Korea; and (iv) compliance with five of the seven worldwide U.S. mutual defense treaties: U.S.-Republic of the Philippines (Mutual Defense Treaty, 1952); ANZUS (Australia - New Zealand - U.S., 1952); U.S.-Republic of Korea (Mutual Defense Treaty, 1954); South East Asia Collective Defense (U.S. - France - Australia - New Zealand - Thailand - Philippines, 1955); U.S.-Japan (Mutual Defense Treaty, 1960). These responsibilities only increase the importance of ubiquitous, redundant, and reliable communications capabilities in Hawaii.

History has also demonstrated that Hawaii's location makes it a key strategic element to our national defense and homeland security effort, as well as a potential lightning rod for attack. Robust, redundant, hardened communications infrastructure is therefore vital to both national security and public safety within the state.

PROVIDING BROADBAND IN AN INCREASING CHALLENGE FOR A CARRIER THAT RECEIVES NO HIGH-COST SUPPORT

HT is the only ILEC operating in the State of Hawaii, and its service territory consists of the entire state. HT's telecommunications network serves approximately 437,500 switched access lines, including approximately 100,700 DSL-based Internet connections.[45] About 55 percent of HT's access lines serve residential customers, 44 percent serve business customers, and one percent serve other customers. About 82

[45] *See* Hawaiian Telcom Holdco Inc. Form 10-K , dated March 28, 1011, filed with the United States Securities and Exchange Commission, page 1.

percent of HT's DSL lines serve residential customers, 16 percent serve business customers, and one percent serve wholesale customers.

Notwithstanding the isolation of the Hawaiian islands, their great variability of terrain, the challenging climate, topography and geologic conditions, the vulnerable rural populations, and the vital strategic importance of robust and reliable telecommunications infrastructure, the current USF mechanism, with statewide averaging of costs, fails to provide any high-cost funding to HT.

HT's study area is classified as a non-rural because it includes the single urban center in the state, Honolulu. Solely because of the inclusion of Honolulu in the study area, HT does not meet any of the criteria established by the definition of a "rural telephone company" in Section 3(37) of the Communications Act.[46] As a result, HT has never received any high-cost support from the federal universal service fund ("USF").

The challenges for HT to serve as the state's Carrier of Last Resort ("COLR") have become even greater with growing demand for broadband-based services. HT's loops are traditional copper cables of assorted gauges, combined with Digital Loop Carrier (DLC) electronics where loops are otherwise too long to sustain service. Outside of Oahu, however, HT's loop plant typically includes older, coarser (22 and 24) gauge cables, and approximately 50 percent of pairs have load coils (compared to 16 percent on Oahu). While HT has taken steps to shorten these loops using DLCs, these steps have simply not been enough. HT's highest-cost loops are an average of 9.4 years old, and rely on manufacturer-discontinued technology that is too old to support broadband.[47]

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46 47 U.S.C. § 153(37).

47 Examples include Seimens 914 DLCs, DMS1 Urbans, SLC5s.

The condition of HT's loop plant and the isolation of many of its wire centers make it uneconomical for HT to bring broadband service to many communities in the state. HT currently serves six wire centers with no broadband capability at all: Hana, Ualapue, Kualapuu, Maunaloa, Honomu, and Lanai City.

Looking more closely at these challenges, one subdivision in Puna called the Hawaiian Acres subdivision has a population of approximately 2,700 and fewer than 1,000 households, scattered across 12,191 acres of land (19.2 square miles) between Kurtistown and Mountain View.[48] Since the households occupy fewer than 25% of the more than 4,000 available lots, the challenge for HT is determining the right level of investment to reach the most customers. The company could place cables and facilities along all 72 miles of roads (of which only 10 miles are paved). However, since this development was 50 years in reaching its current occupancy level, such an investment likely would be substantially underutilized. Furthermore, because commercial electricity is only available to approximately 50% of the Hawaiian Acres homes, HT also must factor in a remote power source and accommodate intermittent generator or photovoltaic use by customers.

In the absence of growth drivers justifying installation of state-of-the-art equipment in low-density areas, HT has been installing or replacing its equipment on a case-by-case basis, as demand arises – a piecemeal solution that can be both inefficient and insufficient. For example, HT owns a total of 113 local TDM base and remote unit switches (switches that the industry is increasingly replacing with IP soft switches),

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[48] Google Earth satellite photos of Hawaiian Acres show how sparsely populated this community is. Taking a 72 lot Tax-Map-Key block, there are approximately 15 homes built, which is typical of the densities in these subdivisions.

located in 86 central offices,[49] and a total of seven tandem switches, only five of which are Class 4 or 5 switches. Many of these switches, particularly outside Honolulu, are running obsolete support software loads that are no longer supported by the manufacturer. Given the age and limited capabilities of the switch hardware, however, the cost of software upgrades is prohibitive.

ATTACHMENT: Map of the island of Molokai

[49] Of these central offices, 39 are located on the island of Oahu, 23 are located on the island of Hawaii, 10 are located on the island of Maui, 9 are located on the island of Kauai, 4 are located on the island of Molokai, and 1 is located on the island of Lanai.